

been conclusively proven that 3 full crops of clover, together with fall pasture, can be produced with irrigation, where only one crop, with pasture, is available under present conditions.

Also, 4 crops of alfalfa, with pasture, can likewise be produced. It is reported that the milk condensery at Hillsboro was compelled to close down because of the great falling off in the milk supply during the past summer. This is a serious matter and calls for investigation and remedy, otherwise the growth of one of our leading industries will be seriously retarded.

Less than 7 per cent of the total precipitation in the Willamette Valley falls during the summer months. During this same period in an irrigated country the equivalent of the entire annual precipitation is applied to the growing crops. It may be surprising to know that the summer precipitation at Denver, Colo., is 4.4 inches; at Cheyenne, Wyo., 5 inches, and at Santa Fe, N. Mex., 6.2 inches, as compared with 2.6 inches at Eugene. The summer conditions are, therefore, more arid in the Willamette Valley than in these arid States. During the spring seed-germinating period, which is the most deficient period for the irrigator, nature supplies and distributes the moisture. At Milan, Italy, where irrigation has reached a high state of development and has been practised for many years, the summer precipitation is 10.2 inches, as compared with 2.6 inches at Eugene. It is believed that these comparisons conclusively demonstrate a deficiency of summer precipitation.

Drainage in some districts should go hand in hand with irrigation. The quick removal of excessive spring moisture would prevent water-logging of the ground and increase by several weeks the length of the growing season. In other districts the drainage through the porous gravelly subsoil is so perfect that the lands are considered of but little value under present conditions. These lands, when irrigated, will become the most valuable.

In no section of the arid West is the water supply more abundant or more accessible than in this valley. No long feed canals or high diversion dams are required to convey the streams onto the land. If reservoirs must be built in order to prevent conflict with the Oregon City power interests, great latitude in their location is possible, as water can be stored on one tributary and diverted from the regular flow of another.

Aside from the human problem, the determination of the physical data to properly outline a large project in this valley is of the greatest importance. Topographic maps, showing the relative elevations of the valley lands, are necessary in the making of even a preliminary plan, also stream discharge measurements extending over several years.

It is necessary to gather such data at public expense. A small appropriation for such work was made by the legislature in 1905, and already 400 square miles in the vicinity of Eugene have been surveyed and gaging stations established on some of the most important streams. To cover the entire valley, at this rate, will require about 20 years. Our neighboring States are more liberal in promoting their own welfare through the gathering of such data, and the United States, through its Geological Survey, will contribute dollar for dollar with each State in such work. This offer was made at the last 2 sessions of our legislature without avail. California, for the past 6 years, has appropriated annually \$40,000, and the survey of the Sacramento Valley is about complete. A gigantic irrigation and drainage project has been outlined and some of the smaller units already are under construction. The State of Washington has recently advanced \$20,000 for such preliminary surveys.

The great commercial development which would follow the placing of 10 to 20 families upon each square mile of valley lands, where but one or two now live, should justify the commercial interests of Portland and all valley towns in contributing the preliminary expense by private subscription. If a comprehensive plan for a large reclamation project is presented to the next legislature and its feasibility assured, the necessary money for surveys will doubtless be appropriated.

THE IDAGON IRRIGATION PROJECT.

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The water supply for this project is to be obtained from Succor, Jordan, Cow, Jump, and Sage creeks. The combined available watershed of these various streams amounts to somewhat more than 300,000 acres, lying in Owyhee County, Idaho, and Malheur County, Oregon, ranging in altitude from 2,700 to 8,000 feet above sea level. The precipitation data available for this region are very meager. From such data as are available, engineers have estimated the precipitation as ranging from 12 to 40 inches annually. The watershed includes a considerable portion of the Owyhee Mountains, where the winter snowfall is heavy (fig. 2). This range of mountains is almost wholly devoid of timber, and from this cause, as well as by reason of its isolation from other ranges, is subject to high winds, hence the snow is piled into huge drifts on the leeward side of the ridges, remaining in these drifts till late in summer, and sometimes throughout the year. A large part of the precipitation occurs outside the irrigating season, rendering storage necessary. The water supply has its legal basis on filings as follows:

Succor Creek.....	500 second-feet.
Jordan Creek.....	200 second-feet.
Cow Creek.....	100 second-feet.
Jump Creek.....	60 second-feet.
Sage Creek.....	20 second-feet.

The work already done consists of a diverting dam on Succor Creek (G, fig. 1) (fig. 3), at an elevation of 2,400 feet, from which

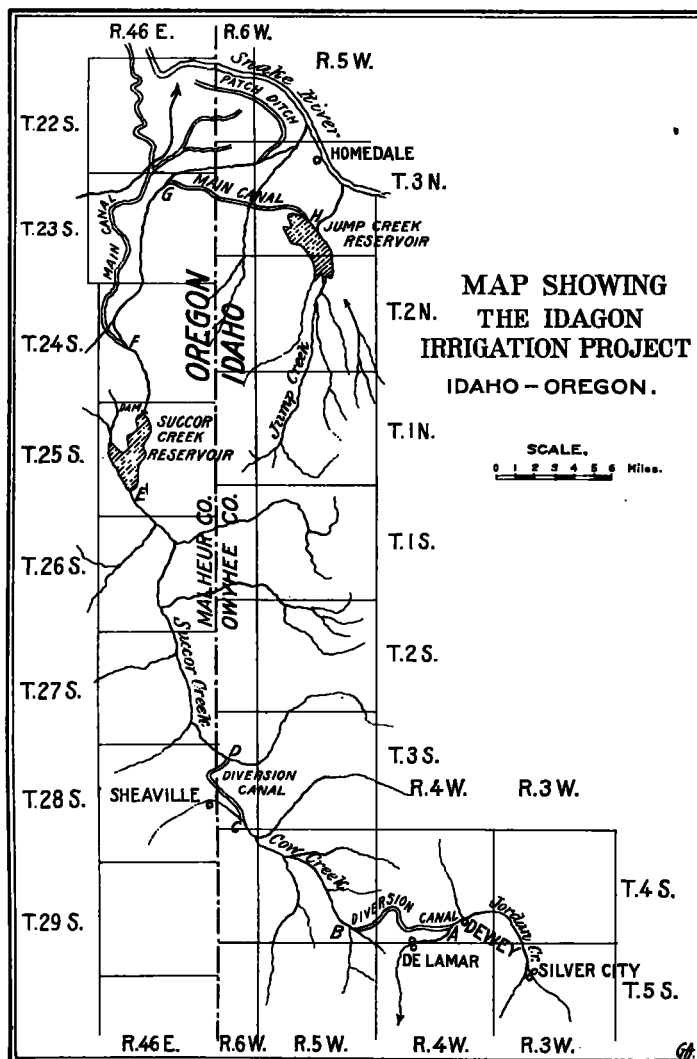


FIG. 1.

a canal 12 feet wide on the bottom is extended to Jump Creek (H, fig. 1), where the base of a dam has been constructed. This dam, when completed, will be used for the purpose of storing flood water. From a point on Jump Creek, some $2\frac{1}{2}$ miles above, a canal 20 feet wide is constructed in a northerly direction, along the east side of Jump Creek, and from the dam 2 canals are constructed in a northerly direction to a point about 1 mile from Snake River. In all, about 20 miles of canals have been constructed. Roads have been built to every part of the project.

The work for which plans have been made is as follows: Beginning at a point between Dewey and De Lamar (A, fig. 2) a diverting canal will be constructed which will carry the water of Jordan Creek across the divide to the headwaters of Cow Creek (B, fig. 1). Thence the water will be conveyed by the natural channel of Cow Creek to a point near Sheaville, Oreg. (C, fig. 1), where it will again be diverted and conveyed by canal to Succor Creek (D, fig. 1), and thence carried by natural channel to the reservoir (E, fig. 1). The reservoir will be formed by the construction of a dam at a point (fig. 4) unusually well suited for this purpose. At this point bed rock forms the creek channel. On the right ledges of rock rise to a height of 700 feet, while on the left the height is 200 feet. At the base and up to a height of 75 feet the width of the opening is but 90 feet; at a height of 200 feet it is less than 300 feet. An abundance of

material for the dam is at hand. At this point there is an elbow in the channel of the creek, which, with the angle of the ledges, forms a natural anchorage. The reservoir site is above the highest point on the tract to be irrigated. From the dam to the point of diversion, some 5 miles below (F, fig. 1), the water is carried first through a tunnel, and then in the natural channel of the stream.

It is planned to cover 25,000 acres by the gravity system outlined, and to develop sufficient water power to pump water from Snake River for 15,000 acres additional. The land is located along and near Snake River in the vicinity of Homedale, Idaho. The soil on the lower levels is sandy loam and on the higher levels is volcanic ash. The altitude at the river is about 2,200 feet and at the base of the foothills is about 2,700 feet. The surface lies in 3 low, but distinct benches. The slope is such as to give good air and water drainage. Such farming as has been done along Succor Creek indicates that the soil is fertile and that conditions are favorable for the growing of fruit as well as grain, hay, and vegetables. Two railroads have surveyed lines touching the tract.

Of the land to be irrigated, 10,000 acres have been withdrawn for reclamation under the Carey Act; 16,000 acres are State lands; the remainder is either private property or is being held under the homestead or desert laws.



FIG. 2.—Snow scene on Jordan Creek, Owyhee Mountains, Idagon Project.



FIG. 3. —Diverting dam, Snow Creek, Idagon Project.

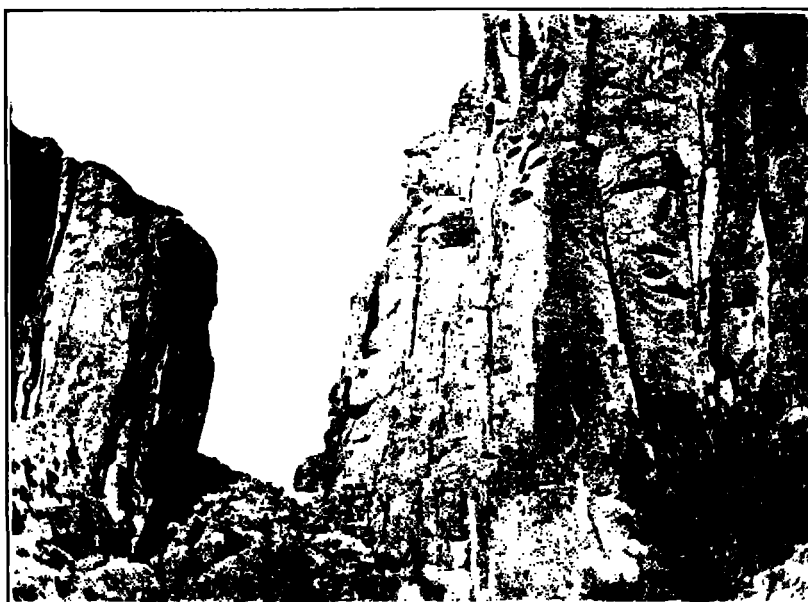


FIG. 4.—Reservoir dam site on Sunor Creek, Idagon Project.